February 5, exposure 45 min.: the image of the Nova is not as well defined at the margin as that of the star D.M. No. 899.

February 13, exposures 15 min. and 5 min. respectively: the image of the Nova is fairly well defined round the margin on each of the photographs.

February 18, exposure 3 hours: the margins of both the Nova and the comparison star No. 899 are nebulous and undefined. There are six stars visible round the Nova, within a radius distance of 50 secs. of arc, and there are also twelve stars round No. 899 within a radius of 50 secs.

The four negatives taken on February 22 and 25 show both the Nova and star No. 899 with well-defined margins, the exposures being respectively 5 mins. and 20 mins.

It will be observed, on examination of the table of the measured diameters of the Nova and the comparison stars, that no decided change in the brightness of the Nova has taken place during the interval between February 5 and 25, if we adopt the photo-images with 20 mins. exposure on the 25th as the standard; but if we adopt the image formed with 5 mins. exposure, there would be shown a fading of the light of the Nova between February 18 and 25.

Photograph of the Region of Nova Cygni. By Isaac Roberts, F.R.S.

Nova Cygni was discovered by Dr. J. F. J. Schmidt at Athens on 1876 November 24, and its co-ordinates for 1878 are given R.A. $21^h\ 36^m\ 55^s$, Decl. $+42°\ 17'·9$. Between that date and the year 1882 many observations concerning the Nova are recorded, but I shall refer only to the catalogue and chart by Drs. Copeland and Lohse, published in vol. ii. of *Copernicus*. These give clear evidence of great care exercised by the observers and delineators in their preparation; and by their aid and the photographs now presented we are enabled to infer that several changes in the stars have taken place during the past ten years.

Two photographs are before us which are enlargements from a negative taken on 1891 September 27, with an exposure of 2 hours in the 20-inch reflector; one of them is enlarged to the scale of one centimetre to four minutes of arc; the other is to the same scale as the chart of the region of the Nova referred to above, which scale is one centimetre to one second of arc.

On the chart is drawn a circle enclosing a space fifteen minutes of arc in diameter, with the Nova as the centre, and I have drawn with pencil on the photograph a line enclosing a space very nearly coincident with that of the chart; we are thus enabled to make comparisons of the two with little trouble. By inspection we soon observe that changes have taken place in the brightness of some of the stars, and also some changes in

their relative positions; but I do not intend to discuss these in great detail for the reason that Dr. Copeland will probably re-survey this region with the aid of the instruments employed by him in the first survey. I will therefore now only refer to a few of the most conspicuous changes in the stars which the photograph indicates.

The stars on the chart catalogue are numbered from 1 to 113, and their magnitudes, position-angle, distance, co-ordinates, and other particulars are given. On the large-scale photograph I have numbered with white ink the stars corresponding with them, to which I will now refer. The Nova is within the white circle.

List of the Stars which have undergone conspicuous change since the year 1878.

No.	2	star,	12·2	mag. on chart,	is about	14	mag. on photograph.
6	„		14·0	„	„	16	„ „
12	„		11·8	„	„	13	„ „
18	„		12·6	„	„	15	„ „
21	„		11·8	„	„	13	„ „
30	„		11·4	„	„	14	„ „
46	„		13·0	„	„	12	„ „

No. 47 is on the photograph a double star, the *comes* being about 14th mag.

The Nova is not given on the chart, but on the photograph it is a prominent object as a star of about 13th mag.

No. 84 star has moved in position-angle from *np* star No. 86 to *n*.

No. 99 star on the chart is single, but on the photograph it is double.

No. 104 star on chart is 11·4 mag., and on the photograph is about 13th mag.

No. 105 star is single on chart, and double on the photograph.

Some of the changes in magnitude which have been indicated may be due, of course, to the well-known differences between eye estimations and photographic diameters, but this only emphasises the necessity of repeating the eye observations, and also, after a sufficient interval of time has elapsed, taking other photographs of the region.

On an Annual Variation in the R—D Discordance.

By H. H. Turner, M.A., B.Sc.

In connection with a discussion of the distribution of temperature in the Transit Circle Room at the Royal Observatory, Greenwich, it occurred to me to inquire whether the R—D discordance varies during the year. Such a variation might be an indication of the dependence of part, or the whole, of the discordance upon the temperature distribution. The major part of the discordance is usually ascribed to flexure of the instrument; and in the case of the Greenwich Transit Circle the closeness with which the law of the sine zenith-distance satisfies the observations certainly points to the probability of this hypothesis. But there is a curious anomaly in the fact that whereas the horizontal flexure thus indicated would be nearly 1″, observations made with the collimators in the ordinary way give a very small horizontal flexure.

It has further been noticed that the residuals of R—D, after comparing the actual observations with this assumed simple law, are persistent in sign year after year at the same zenith-distance, and suggest a secondary discordance not included in the assumed formula. The R—D may in fact be a complex phenomenon, and part of it at least may be due to other causes than flexure. This remark will now be illustrated by a discussion of the residuals for the years 1883–1890, during which the principal (flexure) term of the R—D has remained sensibly constant. Previously to 1883 the range of stars available in reflexion observations was much more restricted, owing to the mounting of the collimators, and the results are thus not so readily comparable. In the years 1883–1890 the results have been grouped in as nearly as possible the same manner; and the mean of the residuals for corresponding groups is given opposite the approximate mean Z. D. of the group.

Mean Residuals of R—D for Years 1883–1890.

Mean. Z.D.	North Stars.	South Stars.	N—S.	Mean Z.D.	North Stars.	South Stars.	N—S.
$68\frac{1}{2}^\circ$	+0″·40	−0″·83	+1″·23	36°	+0″·24	+0″·36	−0″·12
$65\frac{1}{2}$	+0·36	−0·24	+0·60	30	+0·05	+0·38	−0·33
62	−0·24	−0·32	+0·08	26	+0·03	+0·25	−0·22
59	−0·55	−0·18	−0·37	24	0·00	+0·07	−0·07
56	−0·25	−0·28	+0·03	20	+0·02	+0·08	−0·06
52	+0·18	−0·0	+0·24	$16\frac{1}{2}$	+0·06	...	...
48	+0·02	−0·06	+0·08	$12\frac{1}{2}$	+0·18	−0·22	+0·40
42	+0·31	+0·18	+0·13	$9\frac{1}{2}$	+0·23	...	...